
Standardized Test & Student Success Prediction

Group 3

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Problem Statement

For decades, colleges and universities have used standardized tests such as SAT and ACT as a factor in student's admission.

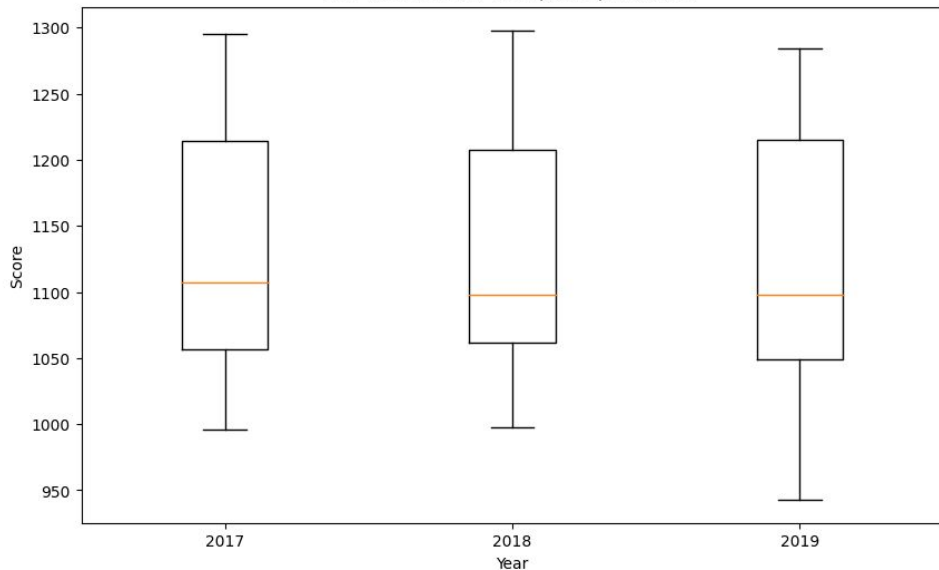
However, when colleges and universities - both small and prestigious - made the standardized tests as optional, universities such as Harvard saw a 42% increase in college application [\(source\)](#).

As data analyst for College Admission Board, we are to assess the **relevance of SAT and ACT tests** by finding out the following:

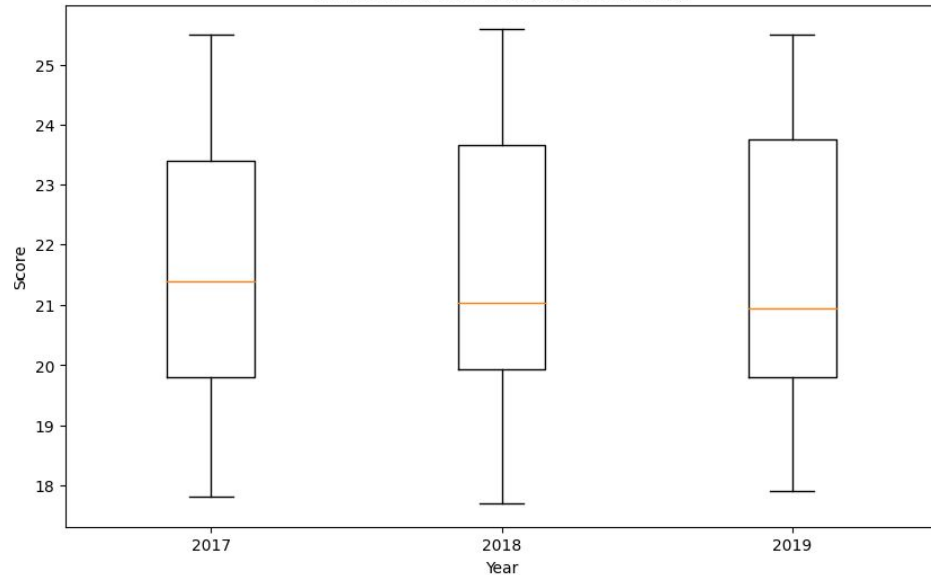
- What are the trends in SAT and ACT scores and participation rates?
- Does SAT & ACT serve as accurate indicators in predicting student success & school metrics?

Trends in SAT & ACT Scores

SAT Score in Year 2017, 2018, and 2019

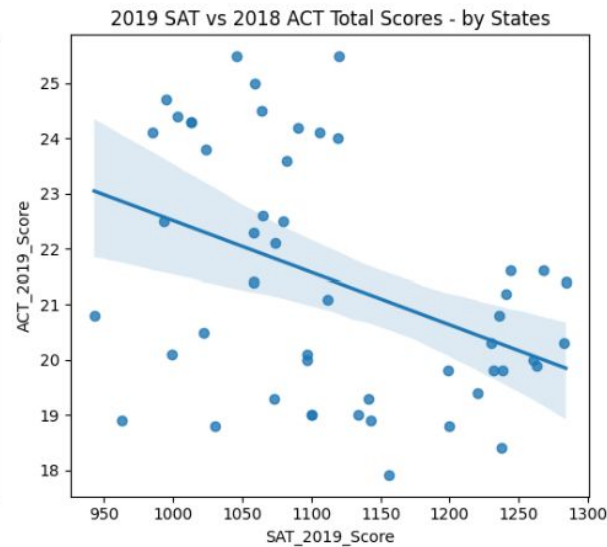
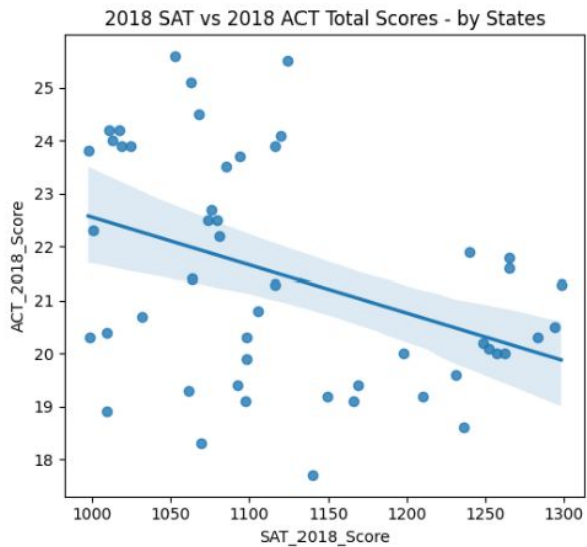
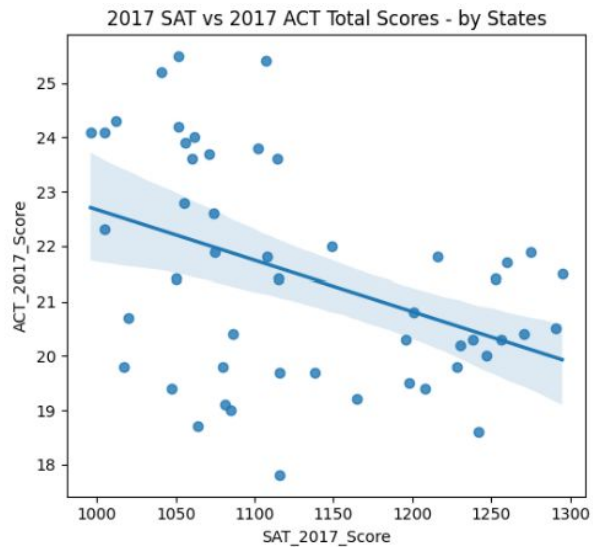


ACT Score in Year 2017, 2018, and 2019



- No significant changes in SAT average score over the years
- There is a drop in maximum & minimum SAT score in 2019
- No significant changes in ACT scores (min, max, average) over the years

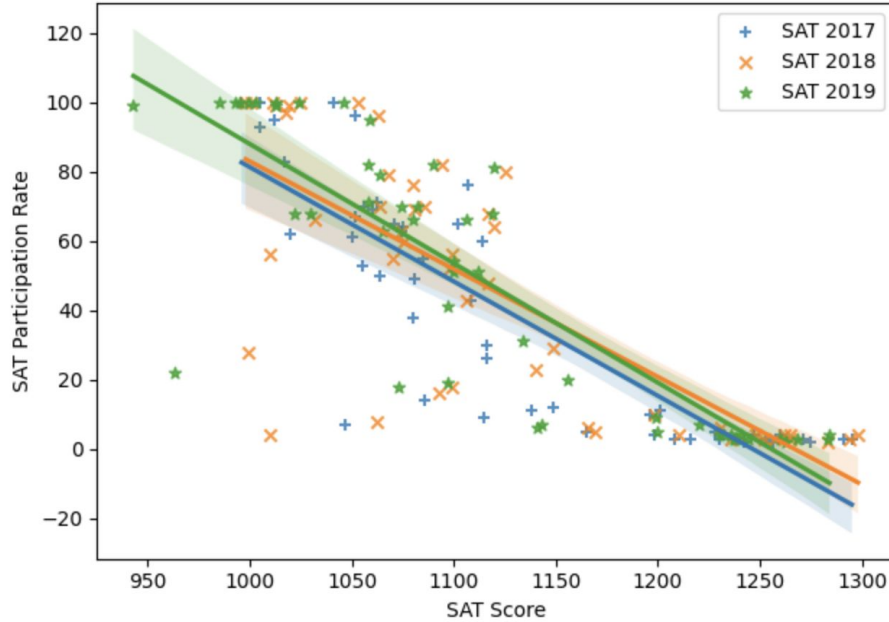
Trends in SAT vs ACT Scores



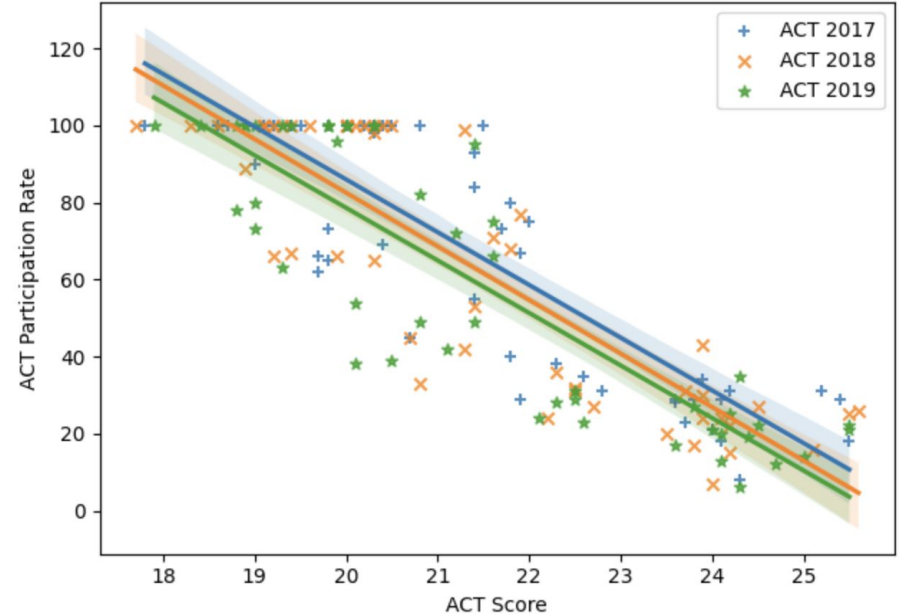
- Generally, ACT and SAT scores are negatively correlated to each other
- It is plausible that states tend to focus on one test over the other.

SAT/ACT Scores vs Participation Rate

SAT Score vs Participation Rate From 2017 to 2019

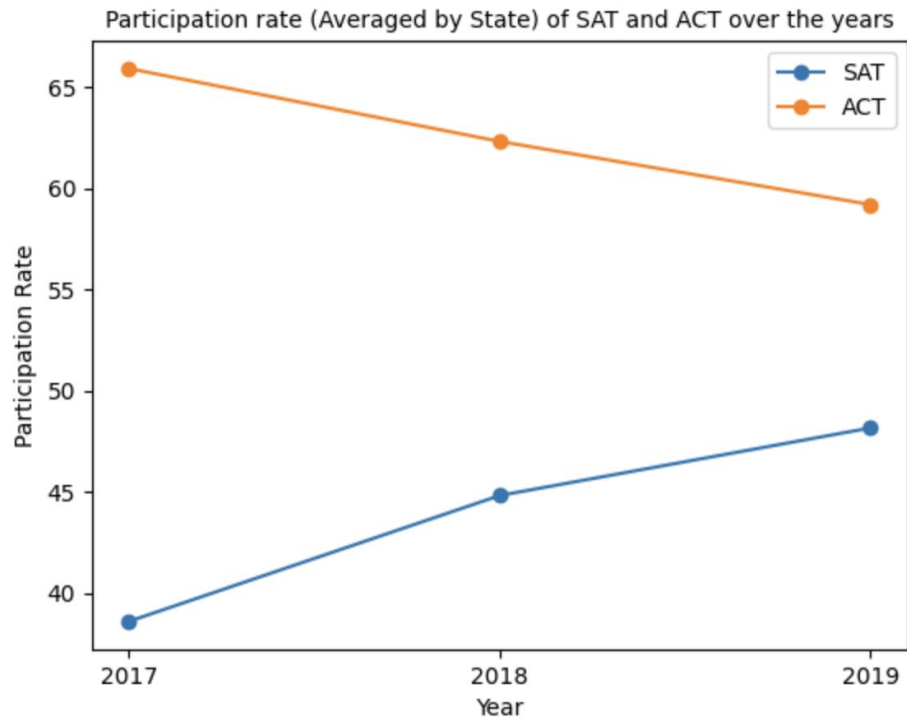


ACT Score vs Participation Rate From 2017 to 2019



- SAT participation rates has a strong negative correlation with SAT scores.
- Similarly, ACT participation rates also has a strong negative correlation with ACT scores.
- This means that the states with higher SAT/ACT participation tend to have lower SAT scores, and vice versa.

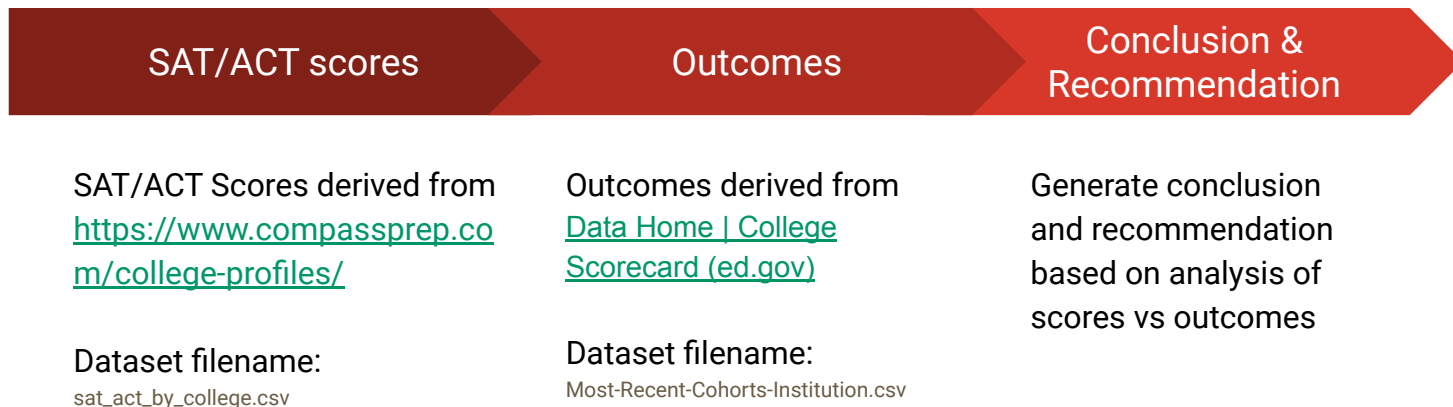
Trends in SAT vs ACT Participation Rate



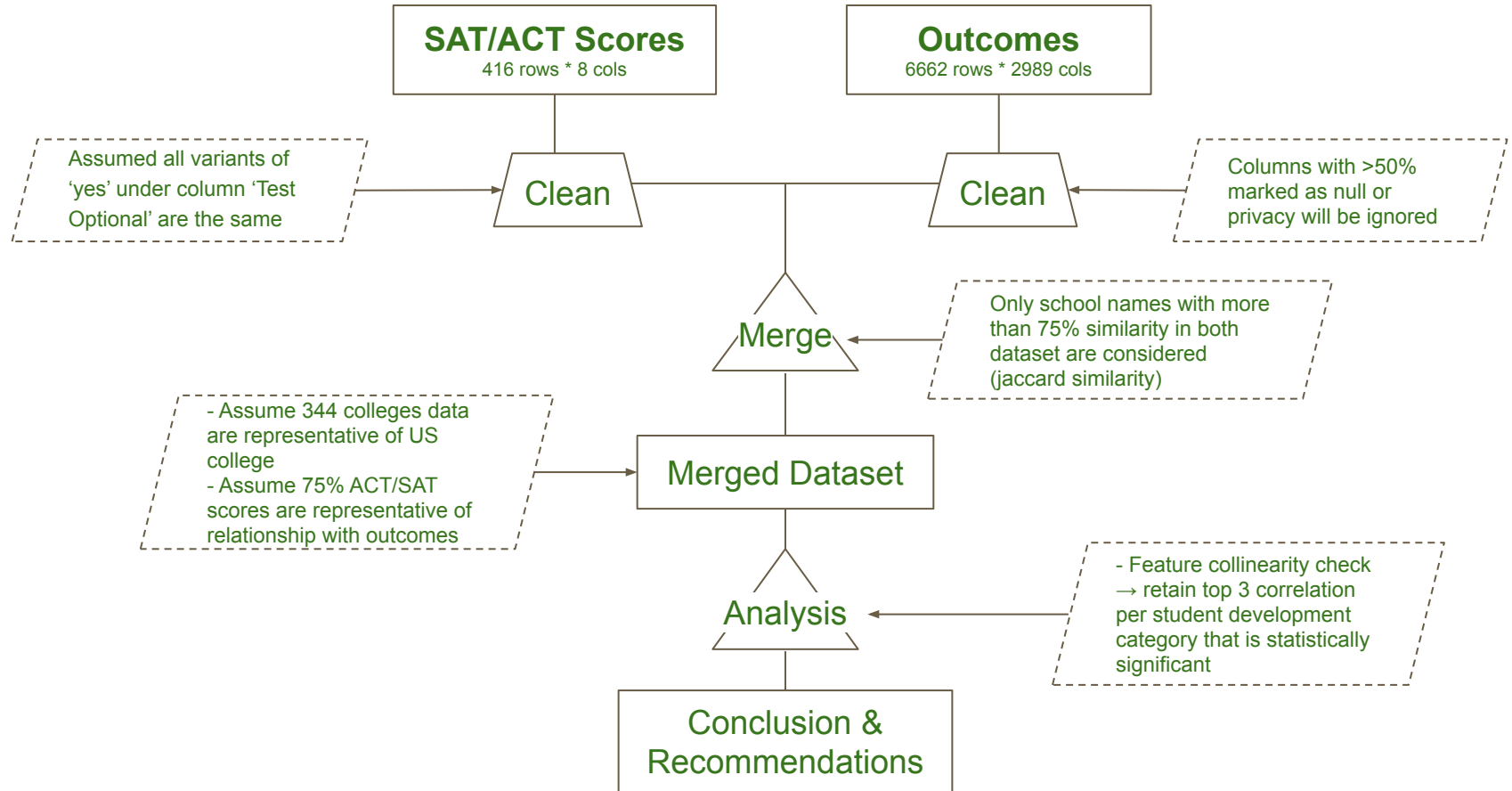
- There's a 10% increase in SAT Participation Rate from 2017 to 2019
- There's a 6% drop in ACT Participation Rate from 2017 to 2019

Methodology

- Does SAT & ACT serve as accurate indicators in predicting student success & school metrics?
- Preliminary analysis of SAT/ACT score effect on school and student outcomes to advise conclusion & recommendation



Methodology



Cleaning Examples (hidden slide)

Assume all type of yes, are the same

```
[29]: #clean Test Optional? column  
sat_act_df['Test Optional?'].value_counts()
```

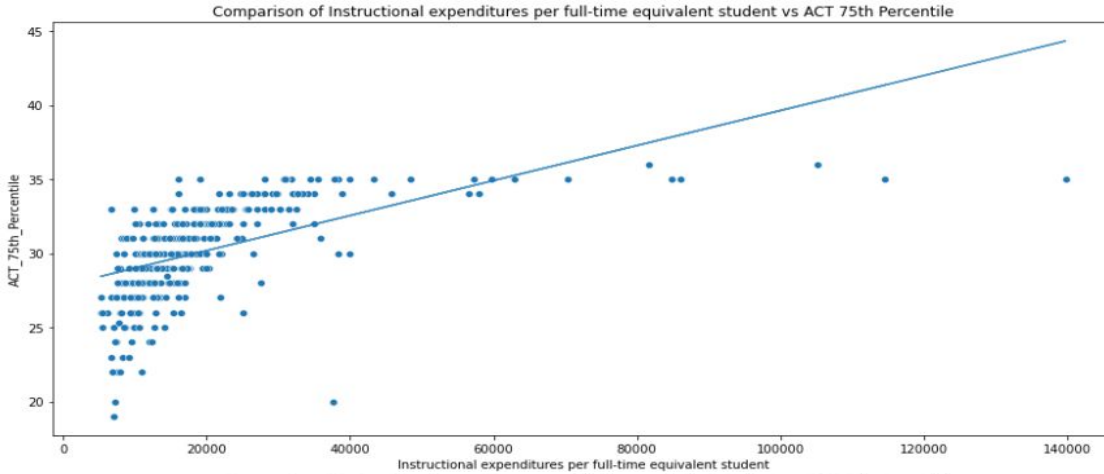
```
[29]: Yes          347  
      No           26  
      Yes (TB)     25  
      Yes*         16  
      Yes (TF)      2  
      Name: Test Optional?, dtype: int64
```

Cleaning Examples (hidden slide)

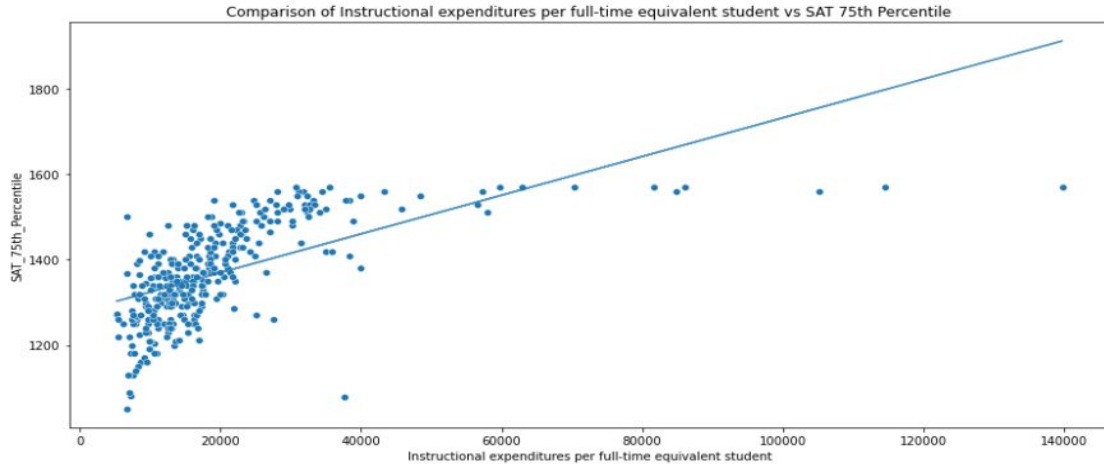
Only school names with more than 75% similarity will be retained

School name from <code>sat_act_by_college.csv</code>	School name from <code>Most-Recent-Cohorts-Institution.csv</code>	Comparison Result %	Retain value?
California State University Los Angeles	California State University Los Angeles	83.33	Y
Hobart and William Smith Colleges	Hobart William Smith Colleges	80.00	Y
Tulane University	Tulane University Louisiana	63.33	N

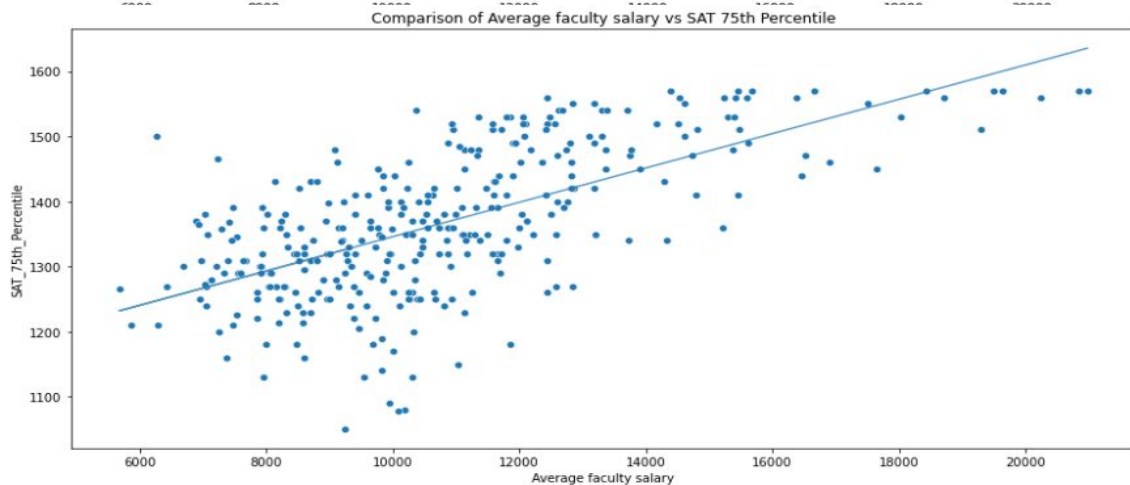
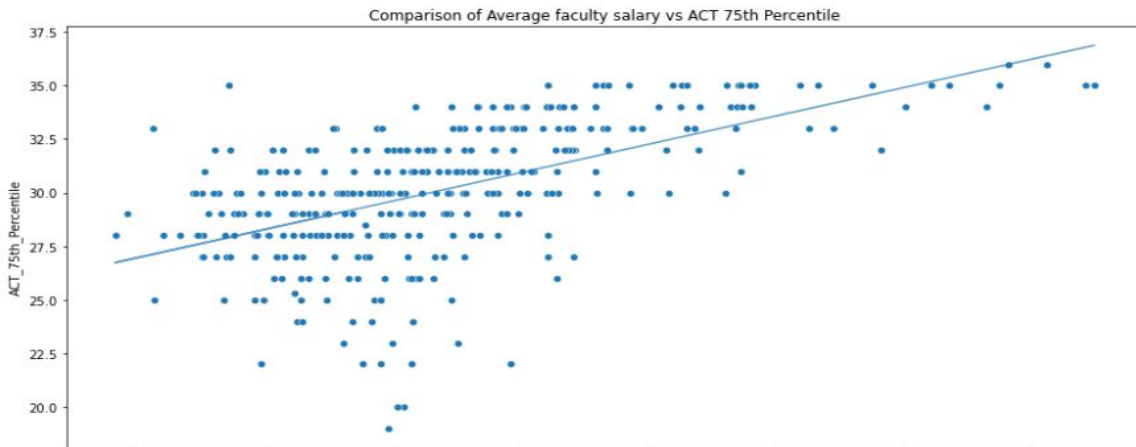
Higher SAT/ACT test scores - More Funding for College



- Both SAT/ACT test scores have a strong positive correlation with instructional expenditure (~0.60)

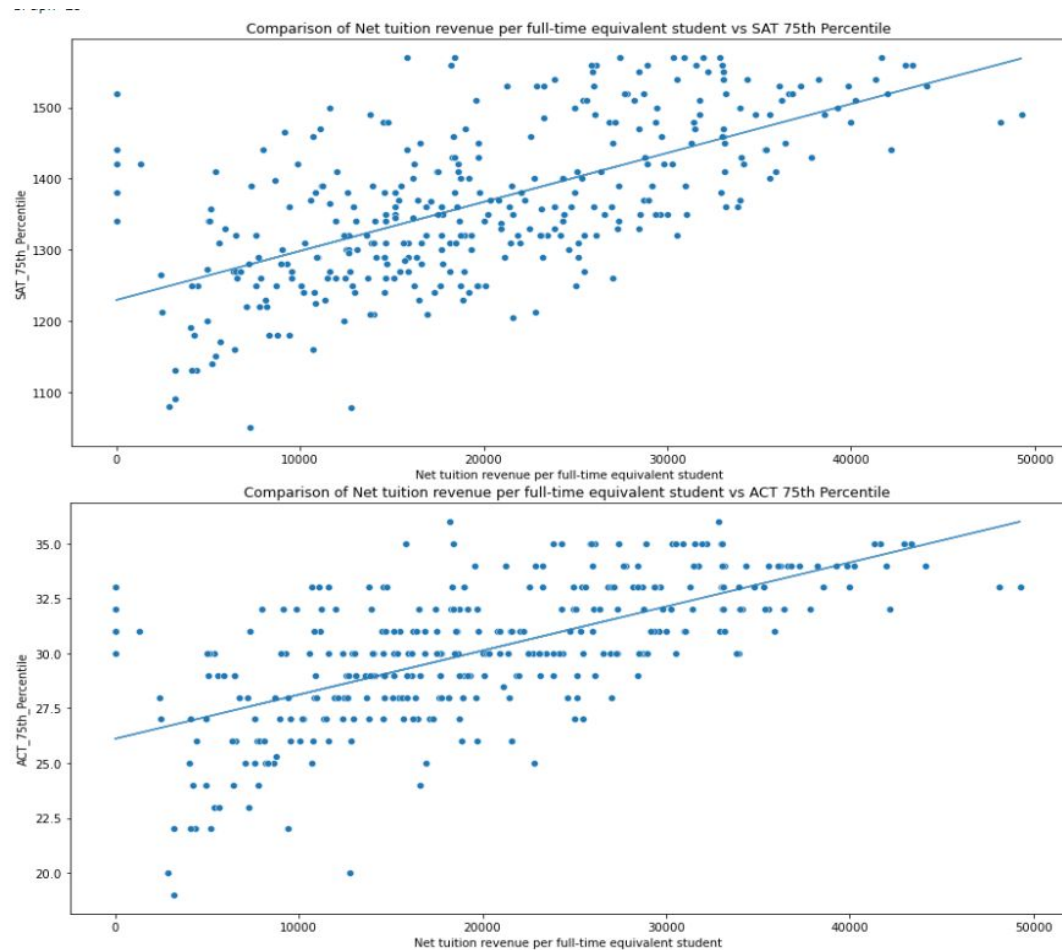


Higher SAT/ACT test scores - More Funding for College



- Both SAT/ACT test scores have a strong positive correlation with mean faculty salary (~0.60)

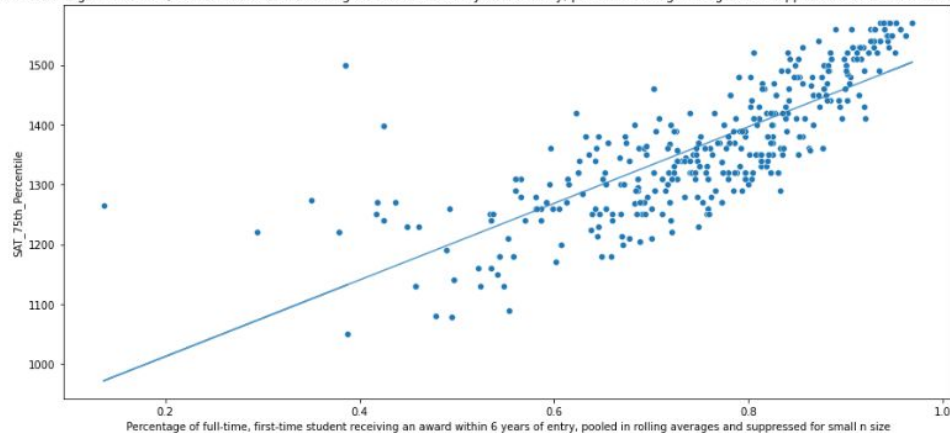
Higher SAT/ACT test scores - More Funding for College



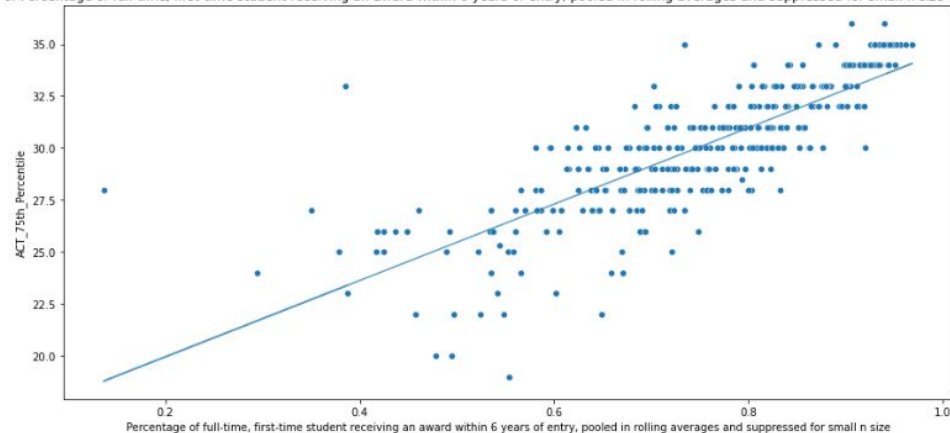
- Both SAT/ACT test scores have a strong positive correlation with net tuition revenue per student (~0.64)
- In view of these 3 factors, we can infer that the higher the test scores, the higher monetary funding the college will receive

Higher SAT/ACT test scores - Higher Completion rate

Comparison of Percentage of full-time, first-time student receiving an award within 6 years of entry, pooled in rolling averages and suppressed for small n size vs SAT 75th Percentile

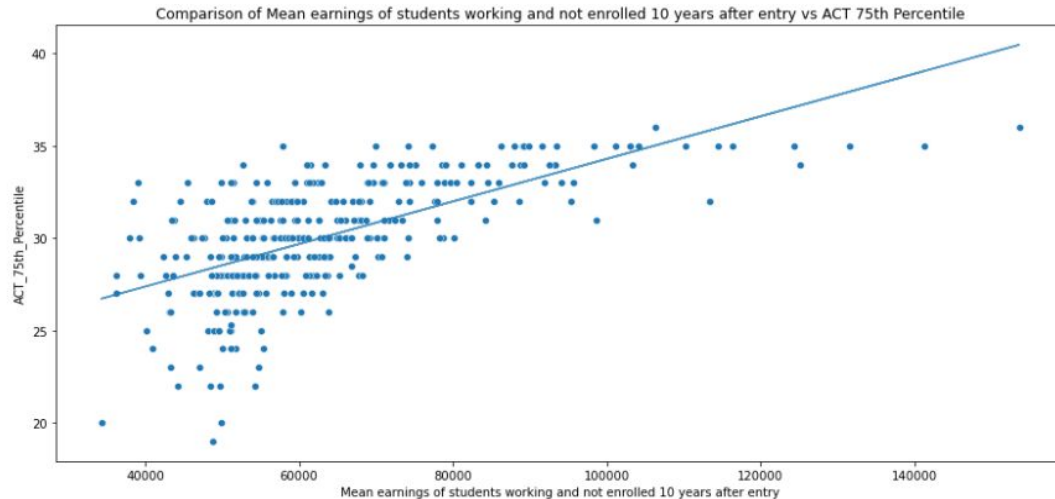
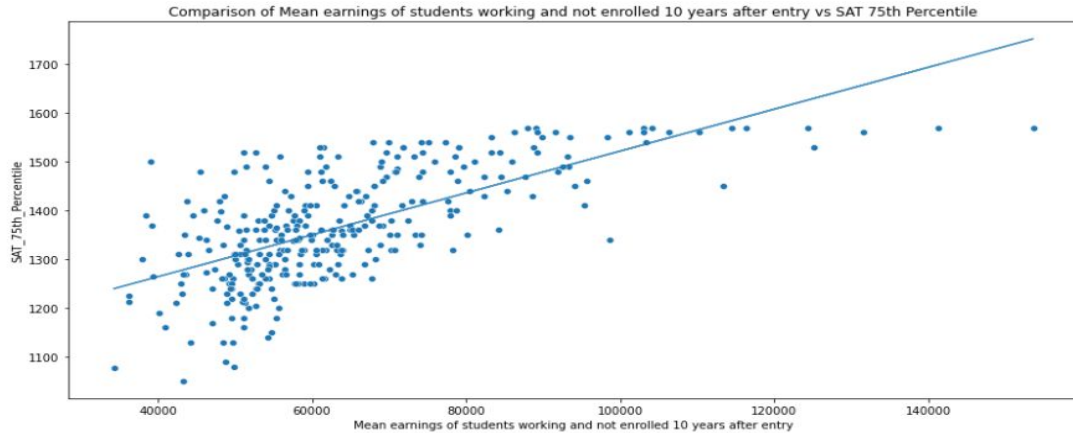


Comparison of Percentage of full-time, first-time student receiving an award within 6 years of entry, pooled in rolling averages and suppressed for small n size vs ACT 75th Percentile



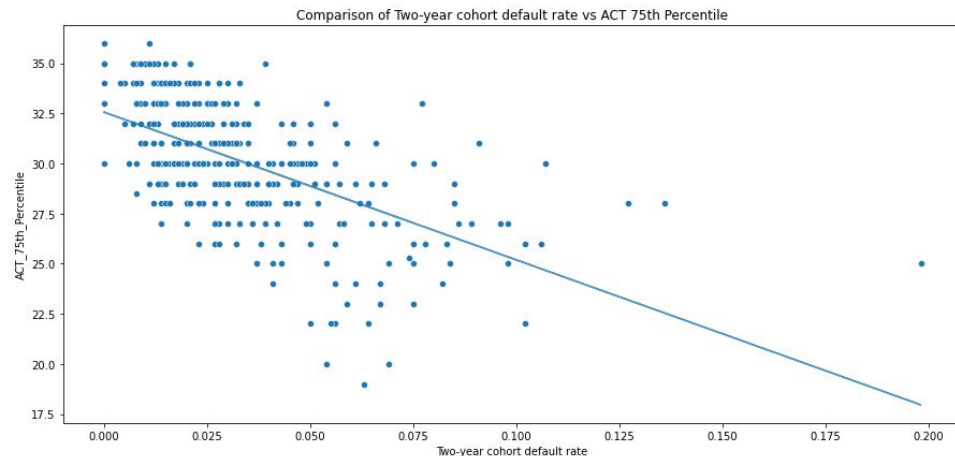
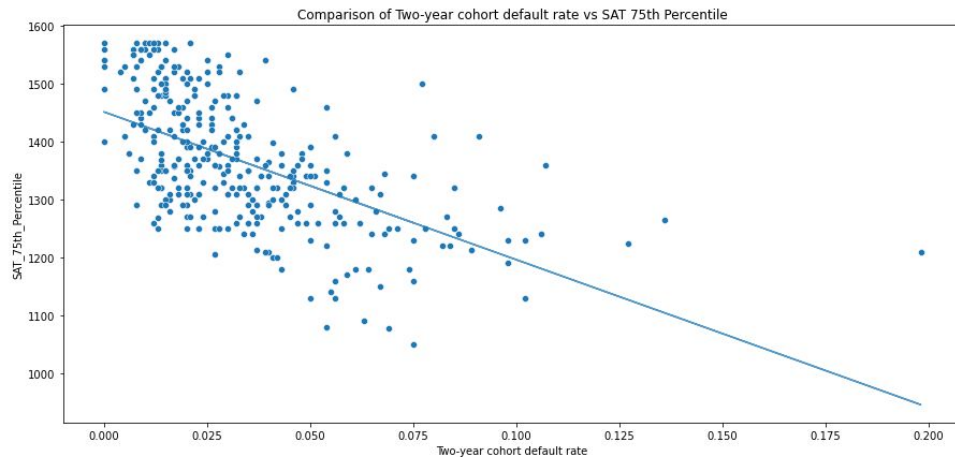
- Both SAT/ACT test scores have a strong positive correlation with completion rate (~0.80)
- We can infer that the higher the student achieved in their test scores, the higher the rate of student completing their degrees

Higher SAT/ACT Test scores - Better salaries for graduates



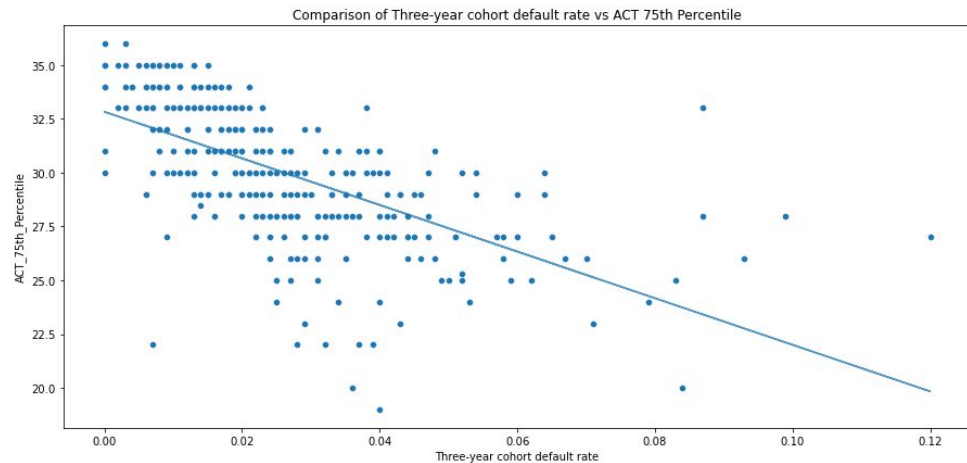
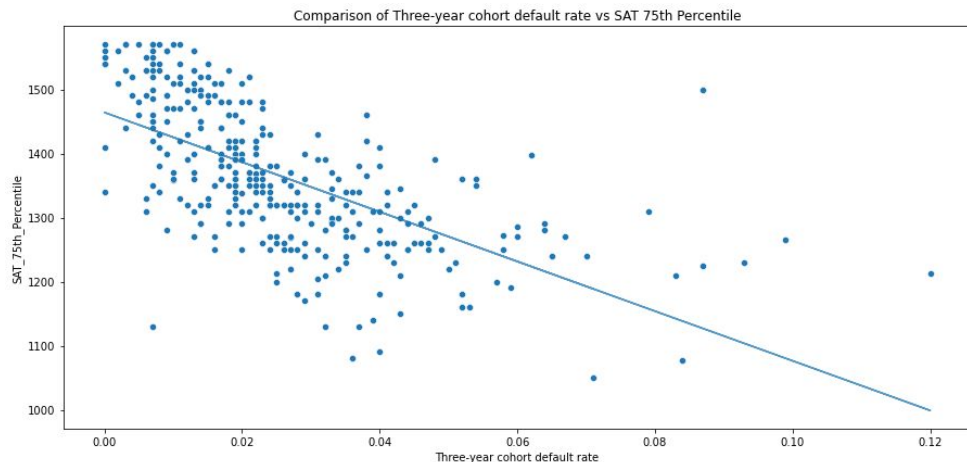
- Both SAT/ACT test scores have a strong positive correlation with salary of graduates (~0.60)
- We can infer that the higher the student achieved in their test scores, the higher the salary of graduates

Higher SAT/ACT Test scores- Lower loan default rate (2yr)



- Both SAT/ACT test scores have a strong negative correlation with loan default rate (~0.60)
- We can infer that the higher the student achieved in their test scores, the less likely they are to default on the loan

Higher SAT/ACT Test scores- Lower loan default rate (3yr)



- Both SAT/ACT test scores have a strong negative correlation with loan default rate (~0.60)
- We can infer that the higher the student achieved in their test scores, the less likely they are to default on the loan

Conclusion

- **Observation from initial analysis**

- There are increase in participation rate of SAT over the years (10%)
- There are decrease in participation rate of ACT over the years (6%)

- **Assumptions in further analysis**

- 344 colleges' data is sufficient to provide accurate inference to our findings
- 75th percentile score is representative of relation with other factors

- **Concluded that higher SAT/ACT scores leads to**

- Better funding for the school
- Higher completion rate
- Better outcome for the students
- Lower loan default rate

Recommendation

- SAT & ACT scores serve as accurate indicators in predicting student success & school metrics and thus should be kept

Further Studies

- Other factors such as relationship shown where higher score lead to lower percentage of PELL grant
- Perform analysis for the 25th percentile score as well as median score (although we recognise that the scores may be in high correlation with the 75th percentile to begin with and may not change the correlation with other factors much)
- Data Home College Scorecard (Most-Recent-Cohorts-Institution.csv) published comprises of data across different years. SAT and ACT scores only between 2017 to 2019. Hence, our final review could be to get the most updated data.
- Comparison with SAT/ACT scores by State with other outcomes